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Fastener for Securing a Gas Bag Module to a Steering Wheel

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Technical Field

The invention relates to a fastener, in particular for securing a gas bag module to a steering wheel, the fastener comprising two fastening arms and a fastener part.

Background of the Invention

Securing the gas bag module, containing the drivers air bag, to a steering wheel needs to satisfy various requirements. For one thing it needs to be rugged enough so that it will under no circumstances become loose during deployment of the gas bag in a restraint situation, but for another, it needs to be releasable for any repair or replacement of the gas bag module needed. Apart from this the time it takes in installing the gas bag module should be a minimum. These requirements can be satisfied by snap-action fasteners in which flexible arms engage protuberances provided on a companion piece. The disadvantage with known snap-action fasteners is that they can only be released with difficulty, or, if easily releasable are not rugged enough.

The object of the invention is to propose a fastener ensuring a safe but readily releasable connection of two components, more particularly of a gas bag module and a steering wheel.

Brief Summary of the Invention

This is achieved in a fastener which comprises two fastening arms and a fastener part. The fastening arms enter into a snap-action connection with the fastener part and clasp the fastener part in a connected condition. Due to the double-sided engagement a firm connection materializes between the

fastening arms and the fastener part. The connection is easily released by pressing apart the arms with a suitable tool, it being of advantage that releasing the connection is non-destructive. Since the fastening arms are pretensioned inwards the risk of the arms being damaged is reduced.

In one preferred embodiment of the invention the fastening arms are provided with hooks having contact surface areas and the fastener part comprises a concave contacting surface area into which the contact surface areas of the hooks engage in the connected condition. This design improves retainment of the hooks on the fastener part. In addition to this the concave contacting surface area of the fastener part serves to guide the contact surface areas of the hooks during release of the connection.

In another preferred embodiment the fastener part and the fastening arms comprise ramps corresponding to each other. These ramps form guides which reduce the loading of the fastening arms on spreading and prevent damage to the snap-action hooks in producing the connection.

Preferably the ramps are configured on the fastener part such that they form an angle and that the fastening arms slide back towards the apex of the angle should the connection fail to be made. This configuration ensures that a component provided with fastening arms, more particularly a gas bag module which to produce the connection is inserted into a component containing the fastener part, more particularly a steering wheel, is urged back should the snap-action connection fail to latch, thus making it easy to recognize faulty assembly. This movement may be supported by a spring.


Advantageously an assembly comprising a steering wheel and a gas bag module is provided, the fastening arms being connected to the gas bag module and the fastener part to the steering wheel in order to improve access to the fastener. Preferably in this arrangement the fastening arms are

configured integrally with the gas bag module, e.g. in the region of the inflator mount or generally a module supporting structure, and the fastener part is configured integrally with the steering wheel, e.g. with its supporting structure. In this way there is achieved a rugged configuration whilst simultaneously reducing the number of components required since the fastener part and the fastening arms, respectively, do not need to be produced as separate elements.

#### 10 Brief Description of the Drawing

The sole Figure shows a section through a fastener in accordance with the invention.

#### 15 Detailed Description of the Preferred Embodiment

 Referring now to Fig. 1 there is illustrated a fastener 10 in accordance with the invention which connects a component e.g. the inflator mount 12 of a gas bag module to a fastener part 14 secured e.g. to a steering wheel by a snap-action connection. The fastener 10 comprises two fastening arms 16 preferably made of a plastics material which end in hooks 18. In the connected condition which is shown, the hooks 18 clasp the fastener part 14 in such a manner that the flat or slightly convex upper sides 20 contact a corresponding undercut, preferably concave surface area 22 on the fastener part 14. In this condition the inflator mount 12 is locked in place against tension in the direction of the arrow A away from the steering wheel.

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In addition the hooks 18 of the fastening arms 16 comprise ramps 24 at their side facing the fastener part 14. The fastener part 14 comprises corresponding ramps 26. Both the ramps 26 of the fastener part and the ramps 24 of the hooks include angles whose legs run towards each other, as seen in the direction of the arrow A. The ramps 26 of the fastener part are preferably configured with two steps 26', 26". The

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first step of the ramps 26' includes a smaller angle than the second step 26".

In making the connection the gas bag module is inserted  
 5 contrary to the direction of the arrow A into its mount in the steering wheel and the fastening arms 16, pretensioned inwardly towards the fastener part 14, slide by their ramps 24 along the ramps 26 and are pressed apart so gently that the edges of the hooks 18 cannot be damaged. The less inclined  
 10 ramps 26' first permit soft seating and shifting with little effort, whereas in the region of the more inclined ramps 26" a sharp increase in the counterforce materializes. Once the hooks have arrived at the end of the ramps 26" the hooks snap back by the distance spread apart and clasp the fastener part  
 15 14.

When the insertion movement of the gas bag module stops before the hooks 18 snap in place in the surface area 22, the fastening arms 16 and thus the gas bag module are urged back,  
 20 due to the spring force of the fastening arms 16, contrary to the direction of the arrow A and away from the steering wheel due to the shape of the ramps 26 of the fastener part - but especially due to that of the ramps 26" - and the ramps 24 of the hooks. This movement is assisted by a spring 28 disposed  
 25 between the steering wheel and the gas bag module, this spring being pretensioned by the insertion movement. It is thus easy to recognize any failure of the snap-action connection to occur.

30 To release the connection the hooks 18 are pressed apart at their ramps 24 by a suitable tool, e.g. a screwdriver until the contact surface area 22 of the fastener part 14 releases the contact surface areas 20 of the hooks 18, the contact surface area 22 serving here as a guide for the contact  
 35 surface areas 20 of the hooks. As soon as the ramps 24 of the hooks 18 are in contact with the ramps 26 of the fastener part, the gas bag module is moved due to the shape of the ramps 24, 26 and the spring force of the fastening arms 16 so

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